California Energy Commission Collaborative State Transmission Assessment Workshop

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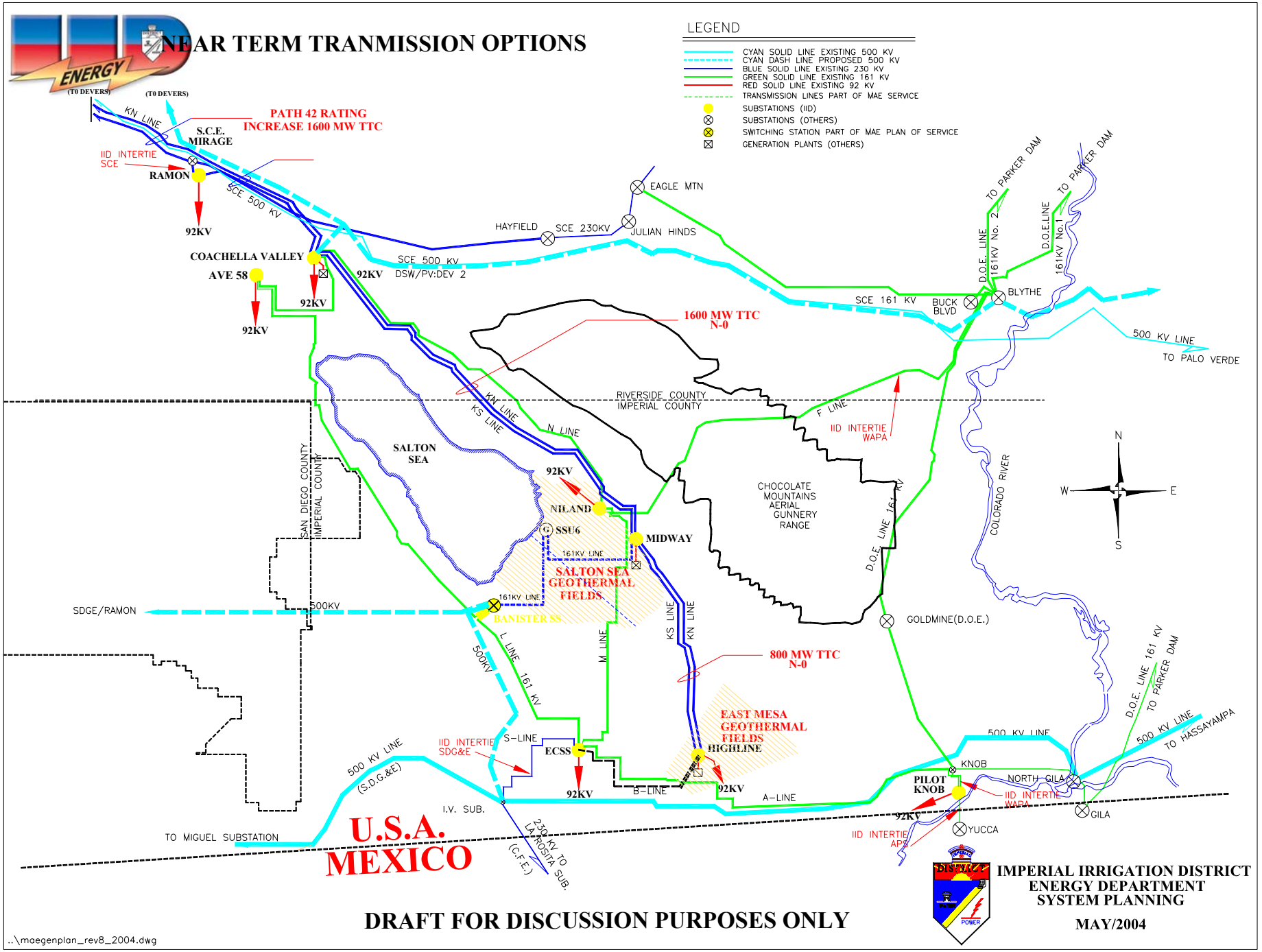
Existing Geothermal Resources in IID's Control Area

- IID's 230 kV Collector System envisioned to accommodate existing and future geothermal resources
- 510 MW of geothermal generation currently wheeled through 230 kV radial collector system and IID grid
    - 340 MW located at the Salton Sea Geothermal fields
    - 90 MW located at the East Mesa area
    - 80 MW located at the Heber, CA area

NEAR TERM TRANMISSION OPTIONS



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Physical Transmission Constraints

- Path 42 (IID-SCE) 600 MW rating fully subscribed (South to North)
- Existing Transmission Congestion at Imperial Valley and Blythe substations would prevent additional geothermal resources delivery to any of these two control area inter-ties

Preferred Interconnection(s)

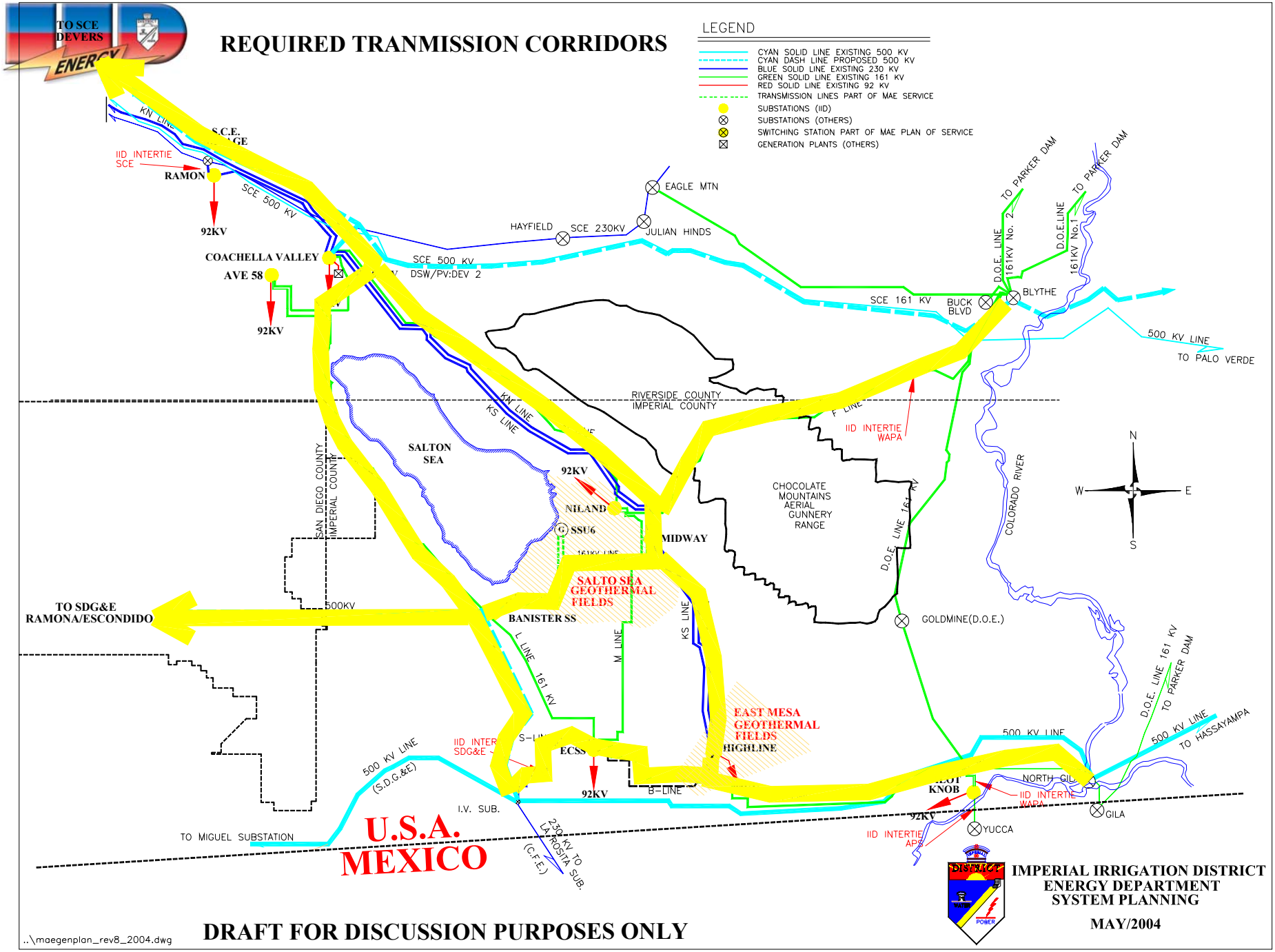
- To IID's 230 kV Collector System at Midway substation
- With Path 42 upgrade (Coachella Valley – Mirage/Devers), this interconnection will support up to 600 MW (Phase I) of new geothermal generation resources
- It can be staged to accommodate a phase development
- Additional geothermal exports to Mirage / Devers could affect SCE's operations

Foreseeable Future Transmission Line Needs to Accommodate Phase I (600 MW)

- 230 kV Coachella Valley-Mirage/Devers transmission lines need to be upgraded to two conductors per phase
- Interconnect Coachella Valley Switching Station to 500 kV transmission system east of Devers
- Upgrade IID's existing 161, and 230 kV transmission lines to higher voltage
- El Centro Switching Station – Highline 230 kV interconnection

Interconnection Alternative for Phase II (over 600 MW of New Geothermal Resources)

- Proposed 500 kV line from IV to SDGE can be looped into IID's switching station to be located nearby Salton Sea area (Bannister)
- New 500 kV line from Midway or Bannister to Coachella Valley/Devers switching stations


REQUIRED TRANMISSION CORRIDORS
LEGEND
CYAN SOLID LINE EXISTING 500 KV
CYAN DASH LINE PROPOSED 500 KV
BLUE SOLID LINE EXISTING 230 KV
GREEN SOLID LINE EXISTING 161 KV
RED SOLID LINE EXISTING 92 KV
TRANSMISSION LINES PART OF MAE SERVICE
SUBSTATIONS (IID)
SUBSTATIONS (OTHERS)
SWITCHING STATION PART OF MAE PLAN OF SERVICE
GENERATION PLANTS (OTHERS)
TO SCE DEVERS
KN LINE
S.C.E.
IID INTERTIE SCE
RAMON
92KV
SCE 500 KV
COACHELLA VALLEY
AVE 58
92KV
HAYFIELD
SCE 230KV
EAGLE MTN
JULIAN HINDS
SCE 500 KV
DSW/PV:DEV 2
TO PARKER DAM
D.O.E. LINE 161KV No. 2
D.O.E.LINE 161KV No.1
TO PARKER DAM
SCE 161 KV
BUCK BLVD
BLYTHE
500 KV LINE
TO PALO VERDE
RIVERSIDE COUNTY
IMPERIAL COUNTY
KN LINE
KS LINE
IID INTERTIE WAPA
SALTON SEA
SAN DIEGO COUNTY
IMPERIAL COUNTY
92KV
NILAND
SSU6
MIDWAY
CHOCOLATE MOUNTAINS AERIAL GUNNERY RANGE
D.O.E LINE 161 KV
COLORADO RIVER
N
W
E
S
TO SDG&E RAMONA/ESCONDIDO
500KV
SALTO SEA GEOTHERMAL FIELDS
BANISTER SS
L LINE 161 KV
M LINE
KS LINE
GOLDMINE(D.O.E.)
EAST MESA GEOTHERMAL FIELDS HIGHLINE
D.O.E. LINE 161 KV
TO PARKER DAM
500 KV LINE
TO HASSAYAMPA
500 KV LINE
(S.D.G.&E)
IID INTER SDG&E
ECSS
92KV
B-LINE
I.V. SUB.
TO MIGUEL SUBSTATION
U.S.A.
MEXICO
230 KV TO LA ROSITA SUB. (C.F.E.)
NORTH GIL
IID INTERTIE WAPA
92KV
YUCCA
IID INTERTIE AP2
GILA
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Conclusions

- System analysis (power flows and Stability) needs to be done to identify local and regional system impacts and most effective transmission system upgrades
- IID's long term transmission expansion plans could incorporate geothermal additions/exports needs (via OATT requests)
- Support is required to facilitate transmission enhancements (i.e. environmental, land use, archeological, BLM, tribal land, etc.)